Geophysical Research Abstracts
Vol. 15, EGU2013-14213, 2013
EGU General Assembly 2013

Application of Box-Behnken design for the removal of two organophosphorus pesticides by used Tea leaves

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Removal of two organophosphorus pesticides bromophos methyl [BM: *O, O- dimethyl – O - (2, 5-dichloro -4 bromophenyl) phosphorothioate*] and quinalphos [QP: *O, O-diethyl O-2-quinoxalinyl phosphorothioate*] on used tea leaves were studied by batch equilibration method. Adsorption isotherms were conformed well to Langmuir for quinalphos and Freundlich equation for bromophos methyl. The kinetic data fitted well by the pseudo second order model for both pesticides. Box-Behnken design was successfully employed for experimental design and analysis of results. The interactions of pH, initial concentration and adsorbent dose on two pesticides adsorption by used tea leaves were investigated by this model. The optimum pH, initial concentration and adsorbent dose with their corresponding removal efficiency were found to be 7.88, 11.94 mg L^{-1}, 0.37g and 100% for bromophos methyl respectively, for quinalphos 8.72, 6.44 mg L^{-1}, 0.39g and 93.98% respectively.

Keywords: Box-Behnken; quinalphos; bromophos methyl; Kinetics; used tea leaves